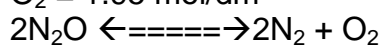
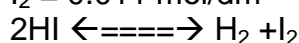
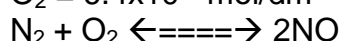
NUMERICAL 10TH

CHAPTER # 09

1

$N_2O = 1.1\ mol/dm^3$
$N_2 = 3.90\ mol/dm^3$
$O_2 = 1.95\ mol/dm^3$
$2N_2O \leftrightarrow 2N_2 + O_2$
$K_c = [N_2]^2[O_2]/[N_2O]^2$
$= [3.90]^2[1.95]/[1.1]^2$
$= [15.21]\ [1.95]/[1.21]^2$
$= 24.51 mol/dm^3$

2

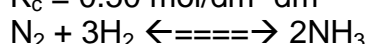
$HI = 0.078\ mol/dm^3$
$H = 0.011\ mol/dm^3$
$I_2 = 0.011\ mol/dm^3$
$2HI \leftrightarrow H_2 + I_2$
$K_c = [H_2]\ [I_2]/[HI]^2$
$= [0.01]\ [0.011]/[0.078]^2$
$= 0.019$

3

$T = 1500\ K$
$K_c = 1.1X10^{-5}$
$N_2 = 1.7X10^{-3}\ mol/dm^3$
$O_2 = 6.4x10^{-3}\ mol/dm^3$
$N_2 + O_2 \leftrightarrow 2NO$
$K_c = [NO]^2/[N_2]\ [O_2]$
$1.1X10^{-5} = \frac{[NO]^2}{[1.7X10^{-3}][6.4X10^{-3}]}$
$[NO]^2 = 1.1X10^{-5}X1.7X10^{-3}X6.4X10^{-3}$
$[NO]^2 = 11.96X10^{-11}$
$= 1.196X10^{-10}$

دونوں طرف جذر لی

$NO = 0.09x10^{-5}\ mol/dm^3$

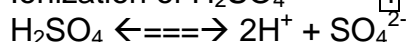
4

$N_2 = 0.3\ mol/dm^3$
$H_2 = 0.50\ mol/dm^3$
$K_c = 0.50\ mol/dm^{-2}dm^6$
$N_2 + 3H_2 \leftrightarrow 2NH_3$
$K_c = [NH_3]^2/[N_2]\ [H_2]^3$
$K_c = [NH_3]^2/[0.3]\ [0.50]^3$
$[NH_3]^2 = 0.50x[0.3][0.50]^3$
$[NH_3]^2 = 0.01875$

دونوں طرف جذر لی

$NH_3 = 0.136\ mol/dm^3$

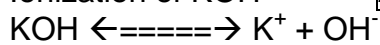
CHAPTER # 10

1

Ionization of H_2SO_4
$H_2SO_4 \leftrightarrow 2H^+ + SO_4^{2-}$

0.2 مولر سلفیورک ایسڈ میں 0.2 مولر کے لحاظ سے دوگنا ہائڈروجن آئنز پیدا ہوں گے

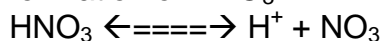
$[H^+] = 2X2X10^{-1}\ M$
$pH = -\log(4x10^{-1})$
$= -(\log4 + \log10^{-1})$
$pH = -\log4 - \log10^{-1}$
$= -0.6 + 1$
$= 0.4$
$pOH = 14 - 0.4$
$= 13.6$

2

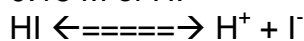
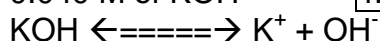
Ionization of KOH
$KOH \leftrightarrow K^+ + OH^-$

0.1 مولر پوٹاشیم ہائڈروآکسائڈ میں 0.1 مولر ہائڈروآکسائڈ آئن پیدا ہوں گے

$[OH^-] = 1X10^{-1}\ M$
$pOH = -\log[OH^-]$
$= -\log[10^{-1}]$
$= -\log10^{-1}$
$= 1$
$pH = 14 - 1$
$= 13$

3

Ionization of HNO_3
$HNO_3 \leftrightarrow H^+ + NO_3^-$

0.004 مولر نائیٹرک ایسڈ میں 0.004 مولر ہائڈروجن آئن پیدا ہوں گے

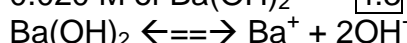
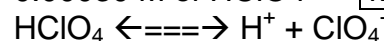
$[H^+] = 1X0.004\ M$
$pH = -\log(4x10^{-3})$
$= -[\log4 + \log10^{-3}]$
$= -\log4 - \log10^{-3}$
$= -0.602 + 3$
$= 3 - 0.602$
$= 2.4$
$pOH = 14 - 2.4$
$= 11.6$

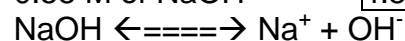
4.1

0.15 M of HI
$HI \leftrightarrow H^+ + I^-$
$[H^+] = 1X0.15\ M$
$= 15X10^{-2}\ M$
$pH = -\log(15x10^{-2})$
$= 0.82$
$pOH + pH = 14$
$pOH = 14 - pH$
$= 14 - 0.82$
$= 13.12$

4.2

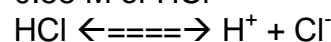
0.040 M of KOH
$KOH \leftrightarrow K^+ + OH^-$
$[OH^-] = 1X0.040\ M$
$= 4X10^{-2}\ M$
$pOH = -\log(4x10^{-2})$
$= 1.40$
$pOH + pH = 14$
$pH = 14 - 1.40$
$= 12.6$

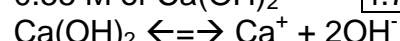
4.3

0.020 M of $Ba(OH)_2$
$Ba(OH)_2 \leftrightarrow Ba^+ + 2OH^-$
$[OH^-] = 2x0.020\ M$
$= 4x10-2\ M$
$pOH = -\log(4x10^{-2})$
$= 1.40$
$pOH + pH = 14$
$pH = 14 - 1.40$
$= 12.6$

4.4

0.00030 M of HClO4
$HClO_4 \leftrightarrow H^+ + ClO_4^-$
$[OH^-] = 1x0.00030\ M$
$= 3x10^{-4}\ M$
$pH = -\log(3x10^{-4})$
$= 3.52$
$pOH + pH = 14$
$pOH = 14 - 3.52$
$= 10.48$

4.5

0.55 M of NaOH
$NaOH \leftrightarrow Na^+ + OH^-$
$[OH^-] = 1x0.55\ M$
$= 55x10^{-2}\ M$
$pOH = -\log(55x10^{-2})$
$= 0.26$
$pOH + pH = 14$
$pH = 14 - 0.26$
$= 13.74$

4.6

0.55 M of HCl
$HCl \leftrightarrow H^+ + Cl^-$
$[H^+] = 1x0.55\ M$
$= 55x10^{-3}\ M$
$pH = -\log(55x10^{-3})$
$= 1.26$
$pOH + pH = 14$
$pOH = 14 - 1.26$
$= 12.74$

4.7

0.55 M of $Ca(OH)_2$
$Ca(OH)_2 \leftrightarrow Ca^+ + 2OH^-$
$[OH-] = 2x0.55\ M$
$= 11x10^{-2}\ M$
$pOH = -\log(11x10^{-2})$
$= 0.96$
$pOH + pH = 14$
$pH = 14 - 096$
$= 13.04$

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